Molecular identification and characterization of dalapon-2,2-dichloropropionate (2,2dcp)-degrading bacteria from a rubber estate agricultural area

Abstract:

The extensive use of herbicides in agricultural area over the past years resulted in environmental pollution. A total of 4 potential bacterial strains were isolated from the rubber estate using minimal media containing 2, 2-dichloropropionate (2, 2-DCP) as sole source of carbon and energy. The 16S rDNA analysis was carried out for genus identification study. Phylogenetic analysis suggested that strains D1, D6 and D9 were closely related with Enterobacter cloacae ATTC13047, whereas, strain Dw was closely related with Burkholderia sp. KU-25 with distance values of 0.001 and 0.004 base substitutions per site, respectively. Since strains D1, D6 and D9 belong to the same genus, therefore, D9 and Dw were further analysed. The growth profiles of both D9 and Dw in minimal liquid medium containing 40, 20 and 10 mM 2,2-DCP were studied. Strain Dw growth was approximately 3 times faster than D9. In conclusion, faster growth rate for strain Dw indicates the pragmatic application of the bacterial strains to degrade residual herbicide in the environment.